

## **Eradication of Emerald Ash Borer in Michigan, Ohio, and Indiana Implementation of the Strategic Plan**

### **EXECUTIVE SUMMARY**

Emerald Ash Borer (EAB), *Agrilus planipennis*, is an extremely destructive wood-boring pest of all North American species of ash trees. It was unknown in North America until June 2002, when it was discovered killing ash trees in southeast Michigan and neighboring Windsor, Ontario, Canada.

This non-native pest poses an enormous threat to our urban and rural forests. Unlike many wood inhabiting insects, EAB kills healthy trees. It is so aggressive that ash trees may die within two or three years after they become infested with the beetle. If it is not contained and eradicated, the impact of Emerald Ash Borer on ash in North America will be similar to that of chestnut blight and Dutch elm disease, which devastated woodland and urban forests in the 20<sup>th</sup> century.

The potential for economic and environmental effects if this wood boring pest were to become established in the United States is extensive. States which become infested could lose billions of dollars in forest products, and quarantines imposed by state and federal agencies may have dire consequences for plant and wood products industries. Severe damage would also occur within the tourist industry. All ash trees are susceptible to EAB attack. According to the Forest Inventory and Analysis data collected by the USDA Forest Service, there are approximately 850 million ash trees in Michigan forests which are at risk; Ohio and Indiana have, respectively, 279,400,000 and 146,900 ash trees in timberland susceptible to EAB infestations. This does not include the millions of ash trees extensively planted in communities, yards, and along public right-of-ways.

Since 2002, APHIS, State, and city cooperators in Michigan, Ohio, Indiana, Virginia, and Maryland have conducted survey and control activities, in addition to the U. S. Forest Service, and have undertaken activities to eradicate this exotic pest. Efforts so far have included imposing quarantines, conducting surveys around confirmed infested sites, removing ash trees, and developing information which will support management efforts. To date, the following states have removed ash trees to control the spread of EAB: 233,784 trees in Michigan; 46,516 trees in Ohio; 9,400 trees in Indiana; 1,000 trees in Maryland; and 287 trees in Virginia. Tree removal in Maryland and Virginia was in response to regulatory incidents in 2003 caused by an illegal shipment of Michigan ash nursery stock into both states. This incident triggered the delimitation surveys followed by tree removals and confirmation surveys. Ongoing survey will continue in Maryland and Virginia in 2006 to confirm eradication actions taken in 2004. Negative survey in these states will result in their release from quarantine status.

Originally six (6) counties in Michigan were known to be infested. Intensive survey efforts in 2003 expanded the known infested area to an additional 7 counties, bringing the total number of counties with EAB to 13 counties in Michigan. In 2004, EAB was detected in twenty-six (26) additional counties, including Indiana and Ohio. In December 2004, Michigan added another 7 counties to its quarantine bringing the total to 20 entire counties plus portions of another 15. Twenty (20) of these counties in Michigan and one county in Ohio are considered generally infested. The others appear to have small spot infestations caused by the movement of firewood, nursery stock, or timber. In 2005 21 entire counties and 25 parts of counties in Michigan, 4 entire counties in Indiana and 1 county and parts of 10 counties in Ohio were quarantined for EAB.

Lack of effective survey and control technology other than tree removal has made eradication efforts challenging. The 2004 trap tree survey was an attempt to implement another tool for detection of EAB. This improved survey technique, which is less labor intensive than visual survey, provides a better method of detection. A lure-based trapping system, which has yet to be developed, would greatly enhance the program's effectiveness.

This document describes an aggressive joint Federal, State, and local initiative to eliminate this pest from the United States and protect vulnerable urban, forest, and agricultural resources that are at risk. The primary objective is to protect the forest products industry, the ash component of our American forests and park lands, and the urban environment from the destructive impact of EAB. Implementation of the initiative will follow

emergency response guidelines that specify the protocols for survey, control, and regulatory activities for areas infested with EAB. These guidelines will be adjusted for each specific site, taking into consideration local environmental conditions and pest population dynamics. Implementation will also be accomplished in accordance with each respective agency's authorities, regulations, and policies.

## **I. Background**

Emerald Ash Borer was first detected in North America in the summer of 2002 in the Detroit metropolitan area in southeast Michigan and shortly thereafter in neighboring Essex County, Ontario, Canada, but is thought to have been introduced 10 or more years ago. Infestations have been subsequently detected in Ohio in 2003 and in Indiana for the first time in the summer of 2004. Isolated infestations related to quarantine violations were also found in Prince George's County, Maryland, and Fairfax County, Virginia.

The Emerald Ash Borer (EAB), *Agrilus planipennis*, is a non-native insect that poses an enormous threat to our urban and rural forests. The insect is native to Asia and the Russian Far East, where literature suggests that hosts include ash (*Fraxinus*) and possibly walnuts and elms (*Juglans* and *Ulmus*). In North America, EAB has been found only infesting ash (*Fraxinus* spp.) trees. Ash species are common in woodland and also are a major component of the urban canopy in many American communities. Once infested with EAB, a typical ash tree will die in two to three years; however, heavily infested trees may die after only one year, even if healthy when initially attacked.

The potential path of expansion of the EAB infestation is through Ohio and Indiana into the hardwood forests of the Northeast through Pennsylvania and into the Appalachian Mountain States through Kentucky. In addition, spread of the pest through the Upper Peninsula of Michigan to Wisconsin and New York also exists as a possibility. The economic impact would be devastating if it spread from currently infested areas into the forests of the northeastern United States, where nursery, landscaping, timber, and recreation and tourism industries are economically critical. Nearly 114 million board feet of ash saw timber with a value of \$25.1 billion is grown in the eastern United States. White, black, and green ashes are widespread species and an important component in the forests of the northeastern United States and eastern Canada. Together they make up over 7 percent of all hardwood species and 5.5 percent of all species. The wood is used for a variety of applications including tool handles, wooden baseball bats, furniture, flooring, cabinetry, solid wood products, packing materials, pulp, and paper.

The potential national impact of EAB on the urban environment alone is 0.5 to 2 percent loss of total leaf area, or 30-90 million trees with a loss of \$20-60 billion dollars. Michigan implemented a moratorium on importing and selling ash nursery stock in the Lower Peninsula of the state, impacting at least 9,519 nurseries. The State's 1,847 logging companies and sawmills are also affected by their inability to receive ash logs from the quarantined area. Additionally, more than 2500 private campgrounds in the tri state area have been impacted; many are losing business when campers are told they cannot bring firewood from quarantined areas. The area also supports industries that utilize ash for tool handles, rail road ties and pallet production. The continued spread of this pest would threaten these resources and permanently alter the Midwest's forest ecosystem, which in some areas is made up of 20 to 40 percent ash.

In addition to its value in forest ecosystems and for the timber industry, ash has become an extremely popular urban/suburban landscape tree because of its tolerance of less than ideal planting conditions and resistance to gypsy moth and other pests. In fact, it is currently the most commonly planted tree in new residential and new commercial developments. It has been planted widely in Midwest States to replace elms lost to Dutch elm disease, but it is common in parks, other public spaces, and neighborhoods across the United States. The spread of EAB infestations could potentially have an enormous impact on the U.S. nursery industry, municipal governments, and individual home owners. As many as 300 million landscape ash trees have been planted in Michigan alone, with approximately 28 million in the infested area. Removal and replanting costs would be staggering. In an initial economic analysis of EAB, the USDA Forest Service estimated that EAB, if not contained and eradicated, could cause approximately \$7 billion in additional costs to state and local governments and landowners to remove and replace dead and dying ash trees in urban and suburban areas over the next 25 years.

Since 2002, APHIS, States, and city cooperators in all affected states, in conjunction with the USDA Forest Service, have undertaken eradication activities by conducting surveys, imposing quarantines, and removing infested trees. To date, in excess of 520,000 trees have been removed in Indiana, Maryland, Michigan, Ohio, and Virginia. The USDA Forest Service has worked with State Foresters and city officials to help replace trees removed through EAB program activities.

Lack of effective survey and control technology, other than tree removal, has limited progress towards containment and eradication. CPHST's Methods and Development staff (APHIS), the Forest Service, Agricultural Research Service (ARS), and university researchers, are working to provide improved technology for control and eradication. The use of girdled detection trees, a better survey technique, became available for program use in 2004. In 2005, APHIS management proposed a plan to speed up research initiatives that will facilitate EAB program delivery actions. The Accelerated Research Initiative will look at new and ongoing research projects and provide support to foster completion of proposed projects designed to address EAB program objectives.

This document proposes an aggressive joint Federal, State, and local government initiative to contain and eventually eliminate the pest from the United States and protect vulnerable urban, forest, and agricultural resources currently at risk. Containment and eventual eradication of EAB are necessary to protect United States and Canadian ash resources. An economic analysis of the EAB situation indicates that damage will be in terms of billions of dollars if nothing is done and would also result in environmental damage and long-term changes in the North American forest structure. Spread of Emerald Ash Borer into non-infested areas must be halted by incorporating the best science and tools into program activities and through effectively curtailing movement of regulated articles that may harbor the pest in order to ultimately eradicate EAB.

## **II. Primary Objective**

The primary objective is to protect the forest products industries, the ash component in our forests and park lands, the access to ash by Native American peoples for cultural purposes, and the quality of the urban environments from the destructive effects of EAB.

## **III. Implementation Guidelines and Tactics**

Implementation of the EAB program will follow management plan guidelines developed and updated annually by members of the Science Advisory Panel (SAP) and Federal and State program managers that have experience in pest management. These guidelines specify protocols for survey, control, and regulatory activities for areas infested with EAB, but may be adjusted for specific sites, taking into consideration local environmental conditions, pest population dynamics, and epidemiological considerations.

The strategy proposed by the SAP utilizes natural features to help contain and confine the spread of the pest to the Lower Peninsula of Michigan. The Great Lakes prevent the spread of the pest to the west, north, and east except at two points: the Mackinac Bridge between the Upper and Lower Peninsula, and the 38 mile long border between Michigan and Canada along the St. Clair River. A third "gateway" exists south the Michigan border with Indiana and Ohio. And although extensive, containment in this gateway is assisted by the preponderance of agricultural land. The northern and southern gateway is made up of an approximately 50 mile wide band each. Even though the eastern gateway is generally infested, a robust regulatory program will mitigate risk of artificial movement of ash commodities. The program utilizes intensive survey, aggressive regulatory and control activities to contain the pest and prevent additional spread.

The Mackinac gateway and the Michigan-Ohio-Indiana (Tri-state) gateway consist of a 50 mile wide band each. The St. Clair gateway is only 6 miles wide due to the close proximity to the generally infested area. The program utilizes intensive survey, regulatory and control activities in these areas to contain the pest and prevent additional spread.

## Survey:

Initially EAB survey methodology and procedures were limited to visual detection of infested trees, which is a labor-intensive activity. Program personnel examined trees for EAB symptoms such as thinning crowns, dead branches, basal sprouting, bark cracks, serpentine larval galleries, and D-shaped exit holes. Efficiency of this survey method was enhanced by the use of tree climbers or bucket trucks to examine tree crowns and other areas, and by use of destructive techniques requiring peeling off of the bark to inspect for developing EAB larvae in serpentine galleries. Visual surveys were conducted using a 1/8 or 1/4 mile grid (10 or 40 acres respectively) with one survey point per grid square. Within each survey-grid square, the survey crew performed EAB surveys at sites with the highest risk of EAB infestation.

In 2004, girdled detection trees were utilized on the EAB program. Where possible, these ash trees were located on highway rights-of-way and were naturally occurring, not landscape ash trees. These trees were girdled by using a draw knife to remove all bark from an area approximately 6 inches wide, 4 feet above the ground, and encompassing the entire circumference of the tree. The tree was marked with flagging tape or paint and then tagged to identify it as a program monitoring tree. Trees were felled, the bark peeled and examined for any life stages.

The use of detection trees in combination with visual surveys allowed the program to cover both the Upper and Lower Peninsulas of Michigan in calendar year 2004, which is at least a 50% increase over 2003 efforts when only visual survey was used. The addition tree climbers were added to the survey protocol in 2005 to supplement survey effectiveness. Preliminary analysis indicates that girdled detection trees provide a better method of detection of low density EAB populations when compared to visual survey, but are not as effective as a lure-based trapping system available for some other insects. It appears that girdled detection trees are currently the most efficient detecting tool for EAB in areas with multi-year populations, or serve as a good means for targeted survey in areas of higher risk, such as campgrounds, new housing or business developments with recent landscaping, and commercial entities handling or vending ash wood products (i.e. firewood). Their precise efficiency has yet to be determined.

The program priorities for 2006 include finding outlying populations in Michigan's Upper Peninsula and the states of Ohio and Indiana and delimiting them in order to initiated containment strategies for EAB, especially any populations moving toward non-infested states or points outside the northern and southern gateways. These areas referred to as "gateways," are areas from which EAB can spread into uninfested portions of other states or non-infested portions of Ohio, Indiana other UP of Michigan.. New infested areas must also be delimited according to the following criteria:

Table 1

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| <ul style="list-style-type: none"><li>• Proximity to non infested areas of infested states or neighboring states</li><li>• Distance from the generally infested area/regulated areas</li><li>• Proximity to a major host tree resource</li><li>• Other mitigating factors, including age of infestation, geographic size, etc.</li></ul> |
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All high risk sites (sawmills, nurseries, campgrounds, landscapers, and firewood dealers will also continue to be targeted for survey. All public "call in" information regarding possible infestations, mainly reported through program hotlines, will be evaluated and investigated. States beyond the current infested states should consider using their pest survey specialist to target surveys of high risk sites.

The **Science Advisory Panel** (SAP) recommends the following specific survey activities in 2006:

Indiana will conduct a systematic survey with a base layer of nine to thirty-six detection trees/township supplemented with visual survey in the northern 50 mile portion of the state bordering Michigan. They will continue to target all high risk sites for survey (sawmills, nurseries, campgrounds, arborists, landscapers, firewood dealers and "call-ins" from the public.

Ohio will conduct a systematic survey with a base layer of nine to thirty-six detection trees/twp throughout the non-quarantined area of the state. The objective is to define the leading edge so that control and containment activities can be effective. They will continue to target high risk sites for survey, as in the Indiana survey recommendations.

No general survey is recommended for the Lower Peninsula of Michigan in 2006 except for Berrien and Cass Counties. Survey will occur in the Upper Peninsula of Michigan following EAB Management Team survey protocol recommendations.

### **Control:**

The principal control technique before 2004 has been the removal of trees discovered with life stages of EAB and those adjacent trees within a half mile radius from the point of infestation, followed by a herbicide treatment for woodlot trees or grinding of stumps for landscape trees. Alternatives to tree removal, such as felling and leaving infested trees, insecticide treatments, etc. are being explored. Alternatives to tree removal should be approved by the Management Team before implementation.

The low, but unknown effectiveness of visual and detection tree surveys to detect infestations dictates equality in terms of program response to the following:

- Discovery of exit holes in standing trees
- The presence of EAB, any life stage

EAB positives will be delimited based on the same criteria outlined for program priorities in Table 2. In general, infestations farthest removed from the generally infested area will receive the highest priority. Program plan is to “work from the outside in.” Survey responses to EAB positives should consider the use of more aggressive survey techniques, such as the use of tree climbers or bucket trucks, and the felling and peeling of suspect trees, or a combination of these

Control measures to be considered by the EAB program are as follows unless options are approved by the EAB Management Team.

- Perform a minimum of a half mile radius removal around all infested ash trees and resurvey the following year at a higher detection tree density.
- Within a half mile of all infested trees, cut all host trees at or below 4” dbh and let them lie, create islands of girdled/wounded host trees within the perimeter of the cut and treat with pesticide all host trees within the islands of attraction to eradicate any adult emergence from felled trees, remove and digest all other host material following adult emergence and resurvey the next season with detection trees or destructive sampling

If the site is outside the 20 county quarantine area of Michigan, not threatening a gateway, but is considered:

- Infested: perform a half mile radius cut around all infested trees and resurvey the following year at a higher detection tree density; or
- Infested: use an approved treatment (herbicide, insecticide, etc) within a half mile radius of the identified tree and resurvey the following year at a higher detection tree density; or
- Infested: use a combination of tree removal and an approved treatment (herbicide, insecticide, etc) and resurvey the following year at a higher trap tree density. Tree removals at a minimum level of **200** yards from the identified infested tree(s) will be performed for suppression purposes.

### **Regulatory:**

Regulatory activity will focus on preventing the artificial spread of the pest to new areas. In response to program surveys in 2004 and 2005 the regulated area has increased from 5,400 square miles to approximately 19,000 square miles, increasing the regulatory responsibilities of program staff. Regulatory inspections and contacts will be increased, with a commensurate increase in staffing for that program section in order to accomplish the additional workload as discussed in the regulatory strategy for 2006.

Regulatory personnel will be responsible for the following:

- Inspecting and issuing certification documents for ash products.
- Defining, assessing and mitigating pathways of artificial spread of EAB
- Issuing compliance agreements, conducting compliance checks and other inspectional activities.
- Working with Public Relations staff to convey program goals and regulations to industry, government, cooperators, and educate the general public.
- Assisting cooperators in carrying out survey and regulatory activities designed to stop the spread of EAB.
- Assisting cooperators in carrying out control activities designed to eradicate EAB.

### **Outreach:**

Ongoing public awareness campaigns are designed to provide education to residents and encourage their cooperation and support in reporting possible beetle damage in their area and suspected incidents of quarantine violations. Public affairs personnel will continue “gateway” initiatives, such as billboard signage, arranging for public service announcements and newspaper articles, and participating in public venues. Their responsibilities will also include development and distribution of additional informational brochures, public surveys, and posters.

As part of public awareness activities, Public affairs personnel will provide updated information for the regional website at [www.emeraldashborer.info](http://www.emeraldashborer.info).

The focus of outreach and education is to encourage the active participation of target audiences in preventing the spread of emerald ash borer throughout the United States. This is achieved through a variety of initiatives including public meetings, industry seminars, networking, distribution of informational materials, advertising, direct mail and promotional activities. Any state with an ash resource constitutes a potential target for our messages. Messages will change as the program evolves and messages will be developed to meet the specific needs of each state involved.

### **Data Management:**

Data collected by survey and regulatory crews is submitted daily. Electronic data collection devices, such as GPS and laptop computers to promote speed and accuracy in submitting data and to maintain “real time” information, are being used in the field and in the Emerald Ash Borer coordination office in Brighton, Michigan. The database information will be analyzed to look for patterns and trends, to draw conclusions about rate and direction of spread, and ultimately to determine the course of actions needed in the various zones.

## **IV. Eradication Action Plan**

The implementation of the strategic plan for EAB containment and eradication requires a coordinated effort from local, States, and Federal program leaders. The plan incorporates components and tactics that are sufficiently flexible to accommodate most adjustments or modifications if the scope of the program changes or alternative methodologies or technologies becomes available.

EAB finds by county are as follows:

**Table 2**

<b>YEAR</b>	<b>COUNTY</b>	<b>LOCATION</b>	<b>DATE CONFIRMED</b>
<b>Michigan:</b>			
2002	Livingston	Widespread	07/16/02
2002	Macomb	Widespread	07/16/02
2002	Monroe	Widespread	11/22/02
2002	Oakland	Widespread	07/16/02
2002	Washtenaw	Widespread	07/16/02
2002	Wayne	Widespread	07/09/02
2003	Calhoun	Marshall	09/19/03
2003	Eaton	Delta Twp.	07/30/03
2003	Genessee	Grandblanc	06/30/03
2003	Ingham	Lansing	07/07/03
2003	Jackson	Brooklyn	07/02/03
2003	Kent	Wyoming	07/25/03
2003	Saginaw	St. Charles	07/30/03
2003	Shiawassee	Owosso	09/25/03
2003	St. Clair	Cottreville	04/17/03
2004	Alcona	Greenbush	09/14/04
2004	Barry	Carleton Twp.	08/11/04
2004	Berrien	St. Joseph	01/14/04
2004	Branch	Quincy	03/31/04
2004	Cheboygan	Forest Twp.	11/10/04
2004	Clinton	Bath	06/09/04
2004	Crawford	Roscommon	09/20/04
2004	Emmet	Petoskey	09/28/04
2004	Gratiot	Elwell	06/16/04
2004	Hillsdale	Camden	05/19/04
2004	Lapeer	Lapeer	01/13/04
2004	Lenawee	Adrian	01/07/04
2004	Luce	Newberry	
2004	Mecosta	Sears	09/20/04
2004	Midland	Warren Twp.	11/04/04
2004	Muskegon	Montague	04/30/04
2004	Oceana	Pentwater	10/01/04
2004	Ogemaw	Lupton	07/23/04
2004	Presque Isle	Millersburg	09/17/04
2004	Roscommon	St. Helen	04/05/04
2004	Sanilac	Sanilac Twp.	08/20/04
2004	St. Joseph	Nottawa Twp.	11/10/04
2004	Oscoda	Fairview	11/19/04
2004	Manistee	Brethren	12/01/04
2004	Iosco	Greenbush	12/17/04
2005	Grand Traverse	Traverse City	01/25/05
2005	Montcalm	Crystal	01/31/05
2005	Charlevoix	Boyne City	03/28/05
2005	Mason	Ludington St. Park	06/07/05
2005	Montmorency	Hillman	07/14/05
2005	Ionia	Freeport	07/18/05
2005	Benzie	Honor	07/22/05
2005	Huron	Sleeper St. Park	08/02/05
2005	Chippewa	Brimley St. Park	09/09/05

2005	Van Buren	Hartford Twp.	10/14/05
2005	Tuscola	Mayville	11/04/05
2005	Isabella	Cor Twp.	11/28/05
<b>Ohio:</b>			
2003	Defiance	Hicksville	08/13/03
2003	Franklin	Columbus	11/25/03
2003	Lucas	Oak Openings	02/25/03
2003	Paulding	Payne	11/06/03
2003	Wood	Perrysville	09/30/03
2004	Fulton		05/26/04
2004	Henry	Maumee	09/17/04
2005	Hancock	Van Buren	03/23/05
2005	Ottawa	Williston	06/23/05
2005	Delaware	Delaware	07/14/05
2005	Auglaize	Wapakoneta	07/29/05
2005	Sandusky	Woodville Twp.	09/29/05
2005	Erie	Castalia	10/06/05
2005	Williams	Pioneer	10/13/05
2005	Lorain	Ohio Turnpike	11/14/05
<b>Maryland:</b>			
2003	Prince Georges	Brandywine	08/28/03
<b>Virginia:</b>			
2003	Fairfax	Vienna	08/28/03
<b>Indiana:</b>			
2004	La Grange	Shipshewana	05/26/04
2004	Steuben	Freemont	04/16/04
2004	Steuben	Manapogo Park	12/03/04
<b>2005</b>	Adams	Decatur	10/12/05
2005	Randolph	Winchester	10/15/05

#### IV. 1 General Strategy for Outbreaks

##### Years 2006-2007: Phase-In, Delimitation, and Containment

During this phase of the program, a containment strategy will be implemented, focusing on keeping EAB populations out of uninfested areas by protecting the identified “gateways.” This will necessitate the realignment of many of the currently existing program offices in order to place work space in areas where personnel will more easily have access to the principal workload. Some existing staff will be relocated and additional employees will be hired in order to accomplish these activities.



The restructuring of the EAB program, based on recommendations from the Science Advisory Panel, is based on an approach which concentrates resources on defensible corridor areas called “gateways:” the Mackinac Bridge adjacent to the Upper Peninsula of Michigan; the St. Clair River shoreline between Michigan and Canada; and, a 50 mile band stretching from Lake Michigan to Lake Erie through Indiana, Michigan, and Ohio.

*Survey:* Survey will continue to target all high risk sites (sawmills, nurseries, pallet companies, campgrounds, arborists, landscapers, firewood dealers).

A systematic survey with a base layer of 9 to 36 detection trees per township supplemented with visual survey and other approved survey techniques will be conducted in Cass and Berrien Counties in Michigan’s southern gateway and all of the Upper Peninsula of Michigan. Using the same systematic survey protocol, Ohio will survey all non quarantined areas of the state. Indiana will survey more intensively (detection trees and visual) outside quarantine areas.

*Ongoing survey will continue in Maryland and Virginia to confirm eradication actions taken in 2004. Negative survey in these states will result in their release from quarantine status.*

*Ash Reduction:* Recommended activities to reduce the host material through ash utilization and management efforts will be coordinated through USDA Forest Service. USFS will work with State Foresters to develop ash management guidelines and to encourage their incorporation into stewardship plans for private forest lands and management plans for state-owned forest lands. Where appropriate, the Forest Service may develop its own ash management guidelines and look for opportunities to incorporate them into management plans for national forests at risk to EAB or affected by EAB program activities.

The USDA Forest Service will work with the state foresters to formulate plans to reduce ash in high priority EAB project areas in ash woodlands and in urban and suburban areas. These plans will be implemented to the extent that federal and state funding is available. Other federal agencies, such as USDA NRCS, could be encouraged to develop EAB priority areas in their programs to manipulate ash management. State plant pest regulatory should work with other state agencies such as the transportation departments to reduce ash along public roadway and other rights-of-way under their jurisdiction. Significant reductions in the density, basal area, and continuity of ash resources will help to prevent EAB populations from reaching high densities that will be likely to spread by either natural or artificial means into the Upper Peninsula or neighboring states and provinces.

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#### *Regulatory:*

Regulatory activity will assist in preventing the artificial spread of the pest to new areas. Program surveys in 2004 have resulted in an increase of the regulated area from 5,400 square miles to approximately 19,000 square miles, increasing the regulatory responsibilities of program staff. As a result, regulatory inspections and contacts will be increased, with a commensurate increase in staffing for that program section in order to accomplish the additional workload. Establishments will continue to be defined by their risk.

There are three focal points for regulatory activity in the EAB program:

- Establishment and implementation of uniform compliance stipulations for all cooperating individuals and businesses handling regulated articles.
- Identification and monitoring of those individuals and businesses representing a risk for moving EAB infested material that are unable or unwilling to comply with compliance stipulations and/or quarantine regulations.
- Development and performance of special operations to intensely concentrate regulatory resources on a given mode of artificial spread for a short interval.

The difficulties presented for the EAB program include the lack of commercially economic treatments for firewood production and a pest that is regulated by multiple state departments of agriculture as well as the federal government. The standardization of compliance agreements is being accomplished by regulatory managers in concert with cooperators in order to more efficiently work with the regulated industries conducting

business in all of the affected states. Numbers of concerns under compliance will increase as more and more ash in the quarantined areas declines and is removed by proprietors seeking value for the fallen timber. Monitoring of compliance agreements will require a substantial commitment of personnel until quarantines are removed.

Another challenge to the regulatory program is to develop an effective mechanism to regulate the utilization of ash from infested areas in the solid wood packing material way stream. This effort will include extensive outreach to industry in an attempt to use corporate environmental image as a means to gain cooperation.

The information supporting the regulatory focus of identifying high risk pathways of artificial spread is contained within a regulatory data base. This database contains all identified concerns (vendors, handlers, movers) handling regulated material along with their assigned risk level. The risk level is determined by use of a risk matrix table developed for this program, which results in a numerical risk assignment. This risk level determines the baseline frequency of monitoring. Businesses of interest are identified by web searches, state business licenses, trade organizations, yellow pages, personal information, and site visits. Every establishment contacted is given an information packet describing EAB, its damage, explanation of the quarantine, and information on ash resources. Each contact with a business is maintained in the data base, creating an interaction history. Establishments can then be mapped by any number of factors including: geographic area, regulated activity, risk level and/or contact history. Maps and reports are used to further identify areas of risk and plan regulatory work. Locations given highest priority for regulatory mapping are the northern and southern gateways for dispersal of the beetle, as identified by the Science Advisory Panel. Regulatory activity is ongoing on both sides of the gateways to educate the public and identify high risk pathways of spread. Special emphasis will be placed on an area within a 150 radius beyond the northern and southern gateways. This area is targeted as it is the expected range of movement of firewood and logs moving out from the leading edge of the known infested area.

Risk pathway analyses were completed for movement of EAB via commercial ferries and railroads in the Lower Peninsula in Michigan. Analysis of the rail pathway from Michigan's Upper Peninsula is in progress and will be completed in 2006. It is anticipated that analysis will be initiated for rail movement in Ohio and Indiana during this period.

Another aspect of regulatory activity is to identify and conduct special operations or blitzes to serve as deterrents and quality control for movement of regulated articles. These quarantine compliance operations are conducted in concert with state cooperators or as stand alone federal operations. Current operations include: traffic stops to regulate movement of firewood by private citizens and commercial dealers; monitoring ferry operations; quality control monitoring at rest areas and weigh stations to check movement of regulated articles and increase public awareness.

APHIS and the Forest Service will work out the specific agency roles and responsibilities regarding how to address timber sales on national forests which may occur in regulated areas when spot infestations are detected or when EAB naturally spreads into national forests.

*Outreach:* Outreach is a critical component that supports regulatory, survey, and control components of the program. Public relations campaigns focused on industries which may move EAB will be expanded. Ongoing public awareness campaigns will be designed to provide education to residents about moving infested host materials such as firewood and will encourage their support in recognizing and reporting possible beetle damage in their area. Public affairs personnel will also continue "gateway" initiatives, such as of billboard signage, arranging for public service announcements and newspaper articles, and participating in public venues.

#### **Years 2008-2014: Suppression and Control**

Survey, public outreach, and regulatory activities are ongoing during this period. Control activities will have begun in all areas. The EAB program anticipates finding some new infested areas each year.

*Control:* states with confirmed active EAB populations will eradicate all outlying infestations using the following priorities:

Table 3

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| <ul style="list-style-type: none"><li>• Proximity to non infested areas of infested states or neighboring states</li><li>• Distance from the generally infested area/regulated areas</li><li>• Proximity to a major host tree resource</li><li>• Other mitigating factors, including age of infestation, geographic size, etc.</li></ul> |
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The program will consider all tactics at their disposal to obtain the desired maximum effect.

We anticipate that survey activities over the prior three years will have identified additional EAB infested areas threatening or within established gateways. Control activities will peak during this period in order to manage these infestations. We anticipate new treatment initiatives developed in the last three years will more efficiently impact pest populations by effectively suppressing natural spread and eradicating isolated infestations. A lure based trapping system will replace visual and detection tree survey techniques. An effective biological control mechanism will be put in place.

*Regulatory:* regulatory personnel will be responsible for the following activities:

- Inspecting and issuing certification documents for ash products.
- Conducting compliance checks and other inspectional activities.
- Working with Public Relations staff to convey program goals and regulations to industry, government, cooperators, etc.
- Assisting cooperators in carrying out regulatory activities designed to stop the spread of EAB.
- Assisting cooperators in carrying out control activities designed to eradicate EAB.
- Conducting special operations to serve as deterrents and quality control for movement of regulated articles.

### **Years 2015-2018: Deregulation**

Systematic survey activities will continue. After four or five years of survey with no indication of beetle presence, a regulated area is eligible to be removed from quarantine regulations. Deregulation is expected to occur from “the outside-in”.

The Program will continue suppression and eradication initiatives. There will be limited survey in quarantined counties with removal of any remaining ash in these areas.

The EAB program will eliminate all known “outliers” by completing eradication tree removals out to ½ mile, and then maintain surveys around all outliers outside the core.

Regulatory and public outreach activities will be continued in this period.

### **Years 2019-2023: Eradication**

Verification surveys in all areas between the “gateways” will continue and will include the original Michigan core counties. We plan to conduct surveys according to the emergency response guidelines for four years after

the last sign of active EAB presence in an area was recorded. After four years of negative results in an outbreak area, EAB will be declared eradicated from an area.

## **IV.2 Prevention and Early Detection**

A wide variety of exotic tree pests can readily be transported into the United States on untreated wooden pallets, crating, bracing, and other solid wood packing materials (SWPM). Nearly all (97 percent) of the quarantine-significant tree pests found by port inspectors are associated with SWPM.

The USDA's Animal and Plant Health Inspection Service (APHIS) pest risk analysis indicates that EAB hitchhiked to the United States in solid wood packing materials (SWPM), such as crates and pallets, from China. In the last 15 years, trade with China has increased tremendously to \$62 billion a year, which is up from \$5 billion in 1985. As a result, the volume of pallets and crates passing through ports of entry has grown exponentially.

APHIS has published the Final Rule for new requirements concerning the importation of wood packaging material. The implementation date for regulatory enforcement is September 16, 2005. APHIS has set standards for Wood Packaging Material imported into the USA through 7 CFR 319.40 - Importation of Wood Packaging Material, as published on September 16, 2004. The regulations for importing logs, lumber, and other unmanufactured wood articles have been amended by adding treatment and documentation requirements for solid wood packing material (SWPM) imported from China, such as wooden pallets, crating, dunnage, and other wooden packing material, which will now require heat treatments, fumigation, or treatment with preservatives prior to departure from China.

Early detection is essential to successful and efficient eradication of an exotic pest. Discovery of the pest at a stage when the infestation level is low allows managers more flexibility in tactics and control methodologies, providing a greater chance of success for eradication. Upon discovery, immediate and aggressive actions to eliminate the pest results in shorter and less expensive eradication programs.

## **V. Scientific Support**

Scientific support has played a significant role in the development of the program and is expected to contribute additional technical advancements and program efficiencies throughout the life of the program. Major accomplishments thus far include: the use of detection trees for survey; descriptions of early EAB damage, which has enhanced visual survey; a knowledge of the dispersal behavior and distance which have provided the basis for eradication of spot infestations; a better, although still incomplete, knowledge of EAB biology and its host range. This knowledge has provided a better direction of survey activities and a sound basis for an economic analysis. Also, several pesticides have been identified that are efficacious to adult and larval stages. They could be incorporated into the program's control and containment activities.

In September of 2005 an EAB accelerated research initiative was convened to review research in progress, prioritize program needs, and direct future research activities. This initiative should provide expedient technical assistance for EAB program delivery. This initiative and ongoing research is expected to provide additional improvements and enhancements to program components such as: improved regulatory treatments for logs and firewood, practical efficacious control methods for adults and larvae, and enhanced survey tools. These will include biological-based approaches involving pathogens and parasites.

## **VI. Role of Cooperators**

The present plan has been produced in collaboration and consultation with State and local cooperators and the USDA Forest Service. The USDA-APHIS and State and local cooperators will take the lead in managing the survey, regulatory, control, data management, and public awareness operations in the outbreak areas. The specific roles of cooperators will vary between States. Program managers will determine roles and

responsibilities in each State as dictated by legal authorities, expertise, administrative and technical strengths, and available staff, resources, and equipment. The USDA-APHIS will also conduct a national survey targeted at areas in proximity to distribution centers, warehouses, manufacturers, and other entities that receive shipments of materials from China. Also, the USDA-APHIS will accomplish a national public awareness campaign to augment ongoing EAB exclusion efforts.

The USDA Forest Service has actively supported the EAB program since 2002 through its State and Private Forestry and Research and Development branches. The agency's National Forest System branch is now also involved due to the presence of two EAB outlier spots adjacent to the Huron Manistee National Forest in Michigan. The Forest Service intends to prepare its own EAB implementation plan as a companion piece to this plan. The Forest Service document will outline the various roles and responsibilities of each branch of the agency and provide greater detail on how the agency plans to coordinate with the federal and state plant pest regulatory agencies to implement the recommendations of the SAP using existing program authorities, funding, and partnerships with others. The Forest Service response will build upon the roles and responsibilities previously charted out for EAB. To date these include:

***Technical and Scientific Support:*** provide technical and scientific support to APHIS and state plant pest regulatory agencies to detect, contain, and eradicate EAB in the program area. This includes ash management and utilization assistance and advice.

***Survey and Detection:*** promote and support EAB early detection on federal, tribal, and cooperative lands outside of the EAB program area. Cooperate with APHIS through a MOU to survey, regulate, and eradicate EAB infestations on national forest system lands.

***Restoration:*** assist communities affected by EAB to recover from the loss of their ash trees.

## **VII. Public Awareness and Outreach**

The public outreach component is an integral part of the EAB program. Ongoing public awareness campaigns will be designed to provide education to residents and encourage their support in reporting possible beetle damage in their area. Since the beetle is difficult to detect and there are presently no effective lure-trapping technique for this insect, the more people trained to spot symptoms and damage of EAB and report these signs, the better the chance of successful eradication. Public affairs personnel will also continue "gateway" initiatives, such as billboard signage, arranging for public service announcements and newspaper articles, and participating in public venues in order to reach as wide an audience as possible.

The EAB public affairs campaign focuses on (1) increasing public/industry awareness of the program, specifically the artificial spread of emerald ash borer through the movement of firewood, logs and other ash material and (2) engaging the public/industry to support & participate in the program. In addition, the campaign provides support to regulatory staff, management, and other program partners involved in program objectives.

The focus of outreach and education is to encourage the active participation of target audiences in preventing the spread of emerald ash borer throughout the United States. This is achieved through a variety of initiatives including public meetings, industry seminars, networking, distribution of informational materials, advertising, direct mail and promotional activities. Any state with an ash resource constitutes a potential target for our messages. Messages will change as the program evolves.

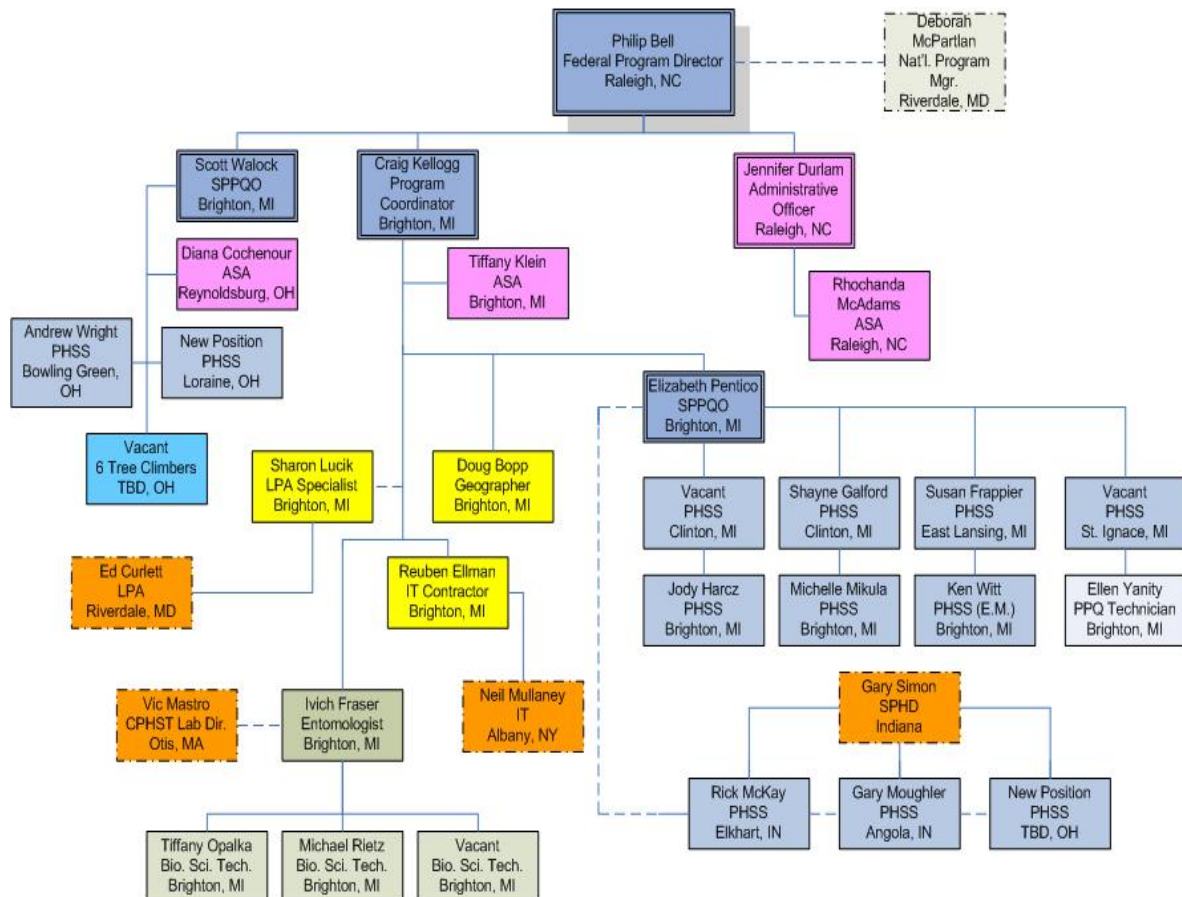
## **VIII. Budget and Equipment**

The primary components of the program are survey, regulatory, and control activities. Survey is required throughout the program for a variety of reasons: first to detect and determine where regulatory and control program activities are needed; second, to monitor the effectiveness of these activities and make program

adjustments accordingly; and, third, to verify that eradication is complete and successful. With currently available technology and methodology, the survey component accounts for approximately 25% of program costs.

The cost of the control program is approximately 49%. Tree removals and treatments account for the majority of these costs. These costs should decrease as alternatives, such as pesticide treatments, cut and leave, and herbicide treatments, are utilized, and as the numbers of new finds decrease.

In order to achieve the goals of this strategic plan, increased staffing and resources will be required. This organizational chart exhibits the federal staffing required to deliver this program in FY 2006 (34 employees).



## **X. Assessment and Evaluation**

Science Advisory Panel meetings are held at least annually in order to review program progress as related to the best science available to the field for control and eradication of Emerald Ash Borer and the implementation of those tools as developed by USDA Methods and Development, the Forest Service, universities, etc.

A program review will be conducted late in 2006, four years after inception of the EAB program. These reviews will be accomplished by a panel of individuals outside of the program who have experience in aspects of large scale eradication programs. This will be initiated every three to four years for the life of the program in order to assess the success of field activities as well as review of the administrative and budget aspects of the program.

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Pittsburgh, Pennsylvania September 26-30, 2005

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